What is claimed is:

1. Extreme UV light source, comprising:

means for producing a plasma from a gas mixture of Xe and a substance which is molecular or atomic at room temperature and which, in a temperature range in which 10-valent Xe ions (Xe^{10+}) occur, emits a number of free electrons from a molecule or an atom that is at least half the number of electrons which are released from a Xe atom and for emitting extreme UV radiation with a wavelength of 13.5 nm from 10-valent Xe ions (Xe^{10+}) which form in said plasma.

2. Extreme UV light source according to claim 1, wherein said substance comprises at least one of the gases Ar, Kr, Ne, N_2 and NH_3.

3. Extreme UV light source as claimed in claim 1, wherein said means for producing a plasma comprises a first electrode and a second electrode, and wherein a narrow small passage is provided for passage of the gas mixture.

4. Extreme UV light source as claimed in claim 3, wherein the average atomic density of Xe in the above described gas mixture in the above described narrow, small passage is at least $2.4 \times 10^{22}/m^3$.

5. Extreme UV light source as claimed in claim 3, wherein said means for emitting is adapted to cause extreme UV radiation to be admitted in a direction of flow of the gas mixture in the narrow small passage.

6. Extreme UV light source as claimed in claim 3, further comprising a means for producing said gas mixture upstream of said narrow small passage.

7. Extreme UV light source as claimed in claim 3, further comprising a space from which gas is supplied to the narrow small passage, means for filling the space with an

atmosphere with at least one of the gases Ar, Kr, Ne, N_2 and NH_3, and means for mixing Xe into said at least one of the gases Ar, Kr, Ne, N_2 and NH_3 upstream of said narrow small passage.

8. Extreme UV light source as claimed in claim 3, further comprising a space from which gas is supplied to the narrow small passage, means for filling the space with a Xe atmosphere, and means for mixing in at least one of the gases Ar, Kr, Ne, N_2 and NH_3 upstream of the narrow small passage.

9. Extreme UV light source as claimed in claim 1, wherein said means for producing a plasma comprises a first electrode and a second electrode, wherein the extreme UV light source is a Z pinch light source having a cylindrical vessel which is located between the first electrode and the second electrode for delivering the gas mixture, and wherein the average atomic density of Xe in the gas mixture in this cylindrical vessel is at least $2.4 \times 10^{22}/m^3$.

10. Extreme UV light source as claimed in claim 1, wherein the extreme UV light source is a plasma focus light source, wherein an outside cylindrical electrode and an inside cylindrical electrode are concentrically arranged, wherein the inside cylindrical electrode has a central through opening for feeding said gas mixture, and wherein the average atomic density of Xe in the gas mixture of a focus part of high temperature plasma formed in a gas emission-side tip area of the inside cylindrical electrode is at least $2.4 \times 10^{22}/m^3$.

11. Extreme UV light source as claimed in claim 6, further comprising a space from which gas is supplied to the narrow small passage, means for filling the space with an atmosphere with at least one of the gases Ar, Kr, Ne, N_2 and NH_3, and means for mixing Xe into said at least one of the gases Ar, Kr, Ne, N_2 and NH_3 upstream of said narrow small passage.

12. Extreme UV light source as claimed in claim 6 further comprising a space from which gas is supplied to the narrow small passage, means for filling the space with a Xe atmosphere, and means for mixing in at least one of the gases Ar, Kr, Ne, N_2 and NH_3 upstream of the narrow small passage.

13. Extreme UV light source as claimed in claim 5, further comprising a means for producing said gas mixture upstream of said narrow small passage.

14. Extreme UV light source as claimed in claim 13, further comprising a space from which gas is supplied to the narrow small passage, means for filling the space with an atmosphere with at least one of the gases Ar, Kr, Ne, N_2 and NH_3, and means for mixing Xe into said at least one of the gases Ar, Kr, Ne, N_2 and NH_3 upstream of said narrow small passage.

15. Extreme UV light source as claimed in claim 13, further comprising a space from which gas is supplied to the narrow small passage, means for filling the space with a Xe atmosphere, and means for mixing in at least one of the gases Ar, Kr, Ne, N_2 and NH_3 upstream of the narrow small passage.

16. Semiconductor exposure device, comprising

an extreme UV light source having means for producing a plasma from a gas mixture of Xe and a substance which is molecular or atomic at room temperature and which, in a temperature range in which 10-valent Xe ions (Xe^{10+}) occur, emits a number of free electrons from a molecule or an atom that is at least half the number of electrons which are released from a Xe atom and for emitting extreme UV radiation with a wavelength of 13.5 nm from 10-valent Xe ions (Xe^{10+}) which form in said plasma,

at least one reflector and

a mask.

17. Semiconductor exposure device as claimed in claim 16, wherein said means for producing a plasma comprises a first electrode and a second electrode, and wherein a narrow small passage is provided for passage of the gas mixture.

18. Extreme UV light source as claimed in claim 17, further comprising a means for producing said gas mixture upstream of said narrow small passage.

19. Extreme UV light source as claimed in claim 18, further comprising a space from which gas is supplied to the narrow small passage, means for filling the space with an atmosphere with at least one of the gases Ar, Kr, Ne, N_2 and NH_3, and means for mixing Xe into said at least one of the gases Ar, Kr, Ne, N_2 and NH_3 upstream of said narrow small passage.

20. Extreme UV light source as claimed in claim 18, further comprising a space from which gas is supplied to the narrow small passage, means for filling the space with a Xe atmosphere, and means for mixing in at least one of the gases Ar, Kr, Ne, N_2 and NH_3 upstream of the narrow small passage.